Advanced Hydrologic Prediction Services (AHPS)

Office of Management and Budget
and
Department of Commerce

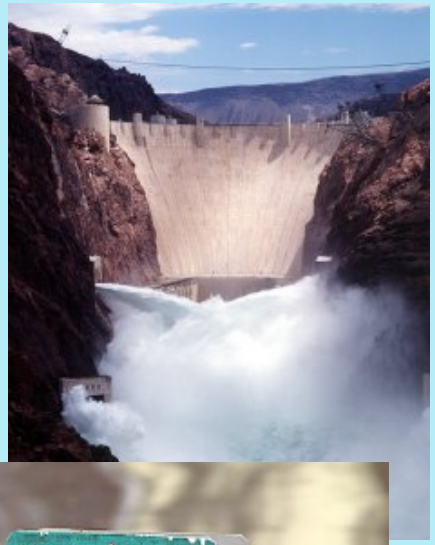
June 25, 2001

George Smith
NWS/Office of Hydrologic Development

Advanced Hydrologic Prediction Services (AHPS)

Overview

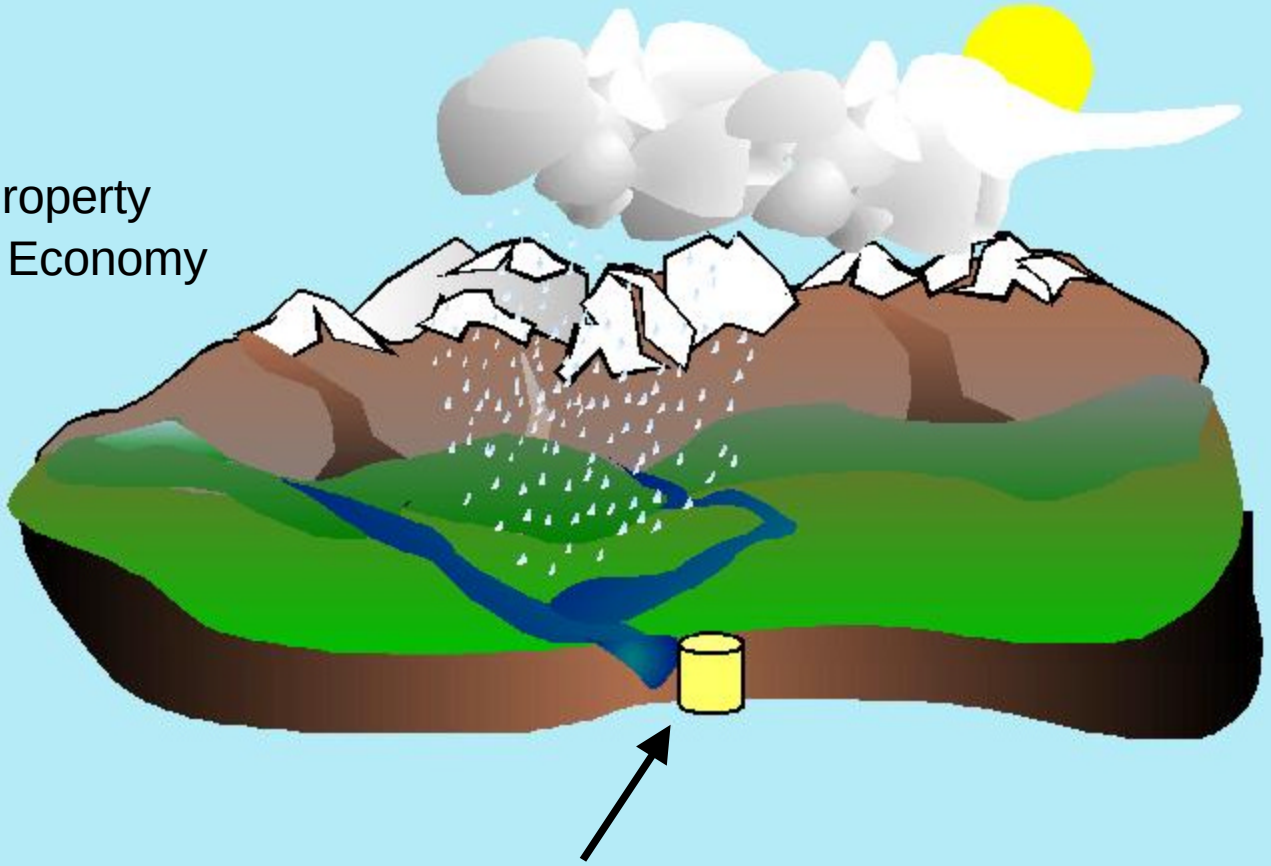
- NWS Hydrologic Services
- Service Improvements
- Demonstrated Value
- Science Improvements
- Program Status



Water Predictions
for
Life Decisions

Linking the Atmosphere and the Oceans: NWS Hydrologic Services

- Protect Life and Property
- Enhance Nation's Economy

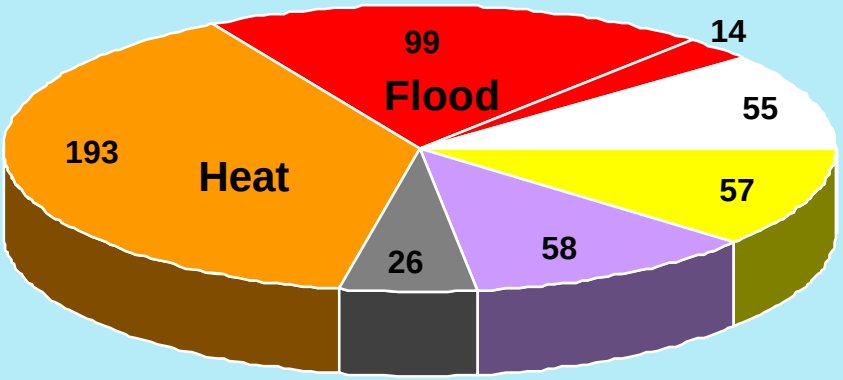


River Forecast Location

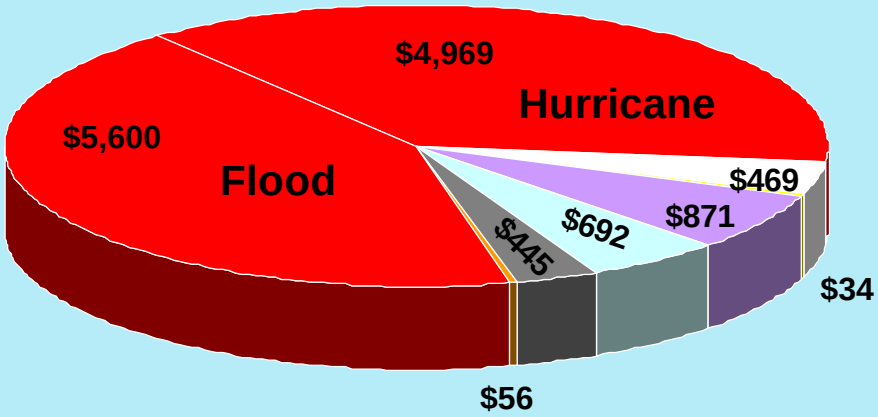
Water Predictions for Life Decisions

Disaster Impacts

Average Annual Deaths (1990-99): 502



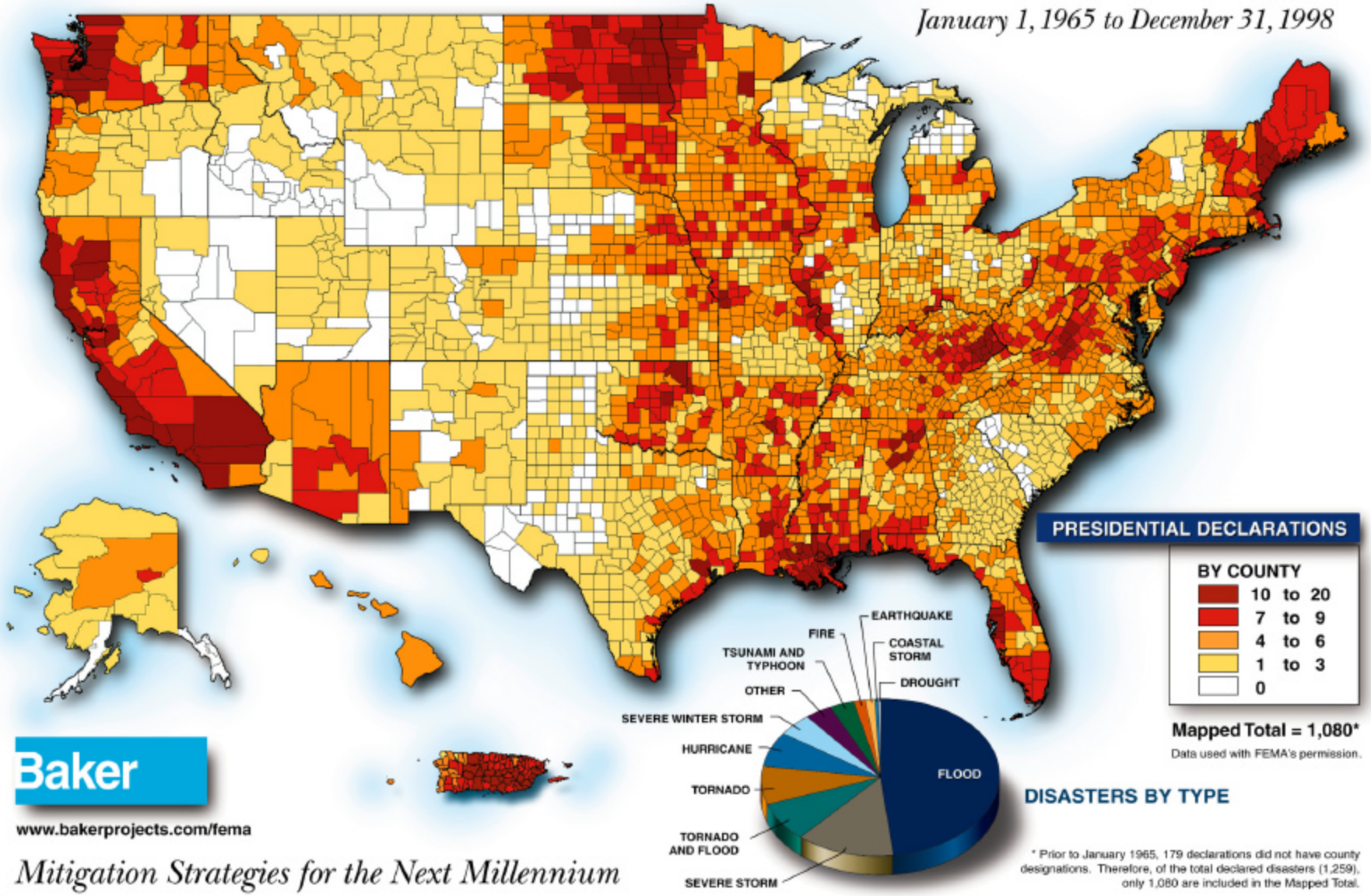
Average Annual Cost (1990-99): $13.1 Billion



- Lightning
- Tornado
- Hail
- Cold
- Heat
- Flood
- Hurricane
- Winter Storm

PRESIDENTIAL DISASTER DECLARATIONS

January 1, 1965 to December 31, 1998



Baker

www.bakerprojects.com/fema

Mitigation Strategies for the Next Millennium

* Prior to January 1965, 179 declarations did not have county designations. Therefore, of the total declared disasters (1,259), only 1,080 are included in the Mapped Total.

Hydrologic Service Customers

River Commerce

Hydropower

Emergency Response

Farming

Recreation

Environment

Water Predictions
for
Life Decisions

National Weather Service
Current Text and Tabular Products

Text Product

```
WGUS43 KFGF 271918
FLSFAR
MNZ001-NDZ014>015-027-272000-
RIVER FLOOD STATEMENT
NATIONAL WEATHER SERVICE EASTERN NORTH DAKOTA/GRAND FORKS
114 PM CST TUE FEB 27 2001

THIS PRODUCT INCLUDES THE FOLLOWING RIVERS AND LAKES...CREEL BAY AND
THE RED RIVER.

FOR THE DEVILS LAKE, INCLUDING DEVILS LAKE, MAJOR FLOODING IS
OCCURING.  FOR THE RED RIVER, INCLUDING EAST GRAND FORKS, NO FLOODING
IS OBSERVED.

FOR THE CREEL BAY NEAR DEVILS LAKE, MAJOR FLOODING IS OCCURING, WITH
A STAGE OF 1446.2 FEET MEASURED AT 06 AM TUESDAY.  THIS CREST
COMPARES TO A PREVIOUS CREST OF 1446.2 FEET ON NOV 8 2000.

FOR THE RED RIVER AT EAST GRAND FORKS, THE LATEST STAGE IS 17.0 FEET
AT 12 PM TUESDAY.
```

Tabular Product

```
SRUS43 KFGF 081815
RVAFAR
MNZ001>005-007-013>015-029-NDZ008-014>016-027-030-038>039-049-053-
090000-
RIVER STAGES FOR THE RED RIVER OF THE NORTH BASIN
NATIONAL WEATHER SERVICE EASTERN NORTH DAKOTA/GRAND FORKS
1213 PM CST THU MAR 08 2001

                    FLOOD     RIVER     24 HOUR    OBSERVATION
   STATION          STAGE     STAGE     CHANGE     TIME

RED RIVER
  WAHPETON            10      8.08       0.13      THU 11 AM
  HICKSON             NA     11.78       0.35      THU 12 PM
  FARGO               17     15.17       0.08      THU 11 AM
  HALSTAD             24      7.58       0.07      THU 11 AM
  EAST GRAND FORKS    28     16.56      -0.03      THU 11 AM
  OSLO                28     10.16      -0.03      THU 11 AM
  DRAYTON             32     12.11       0.01      THU 11 AM
  EMERSON MB        81.5     52.00       0.03      THU 10 AM
```

Advanced Hydrologic Prediction Services (AHPS)

AHPS is the modernization of the NWS Hydrology Program

- Implement advanced hydrologic forecast models at River Forecast Centers
- Provide high resolution, visually oriented forecast products at 4,000 locations Nation Wide
- Refresh aging hydrologic forecasting infrastructure
- Infuse new science and technology

Water Predictions
for
Life Decisions

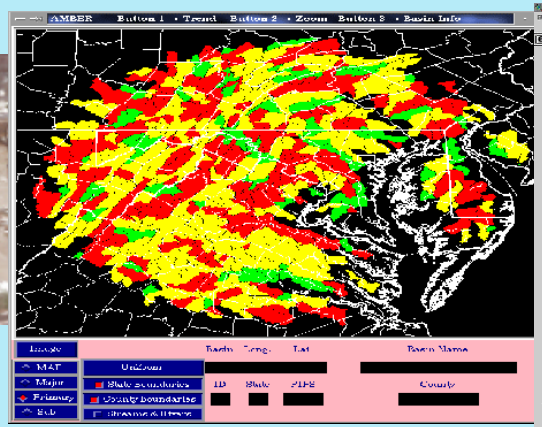
Advanced Hydrologic Prediction Services (AHPS)

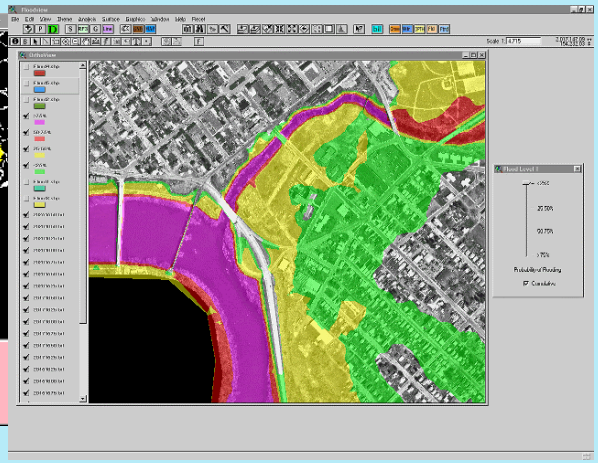
Unmet Customer Needs

- More accurate forecasts over all time scales
- Information to make risk based decisions
- Reach diverse customers
- Graphical products

AHPS Provides

- Flash-flood to seasonal forecasts
- Forecast certainty
- Improved product delivery (Internet, wireless)
- Flood-forecast mapping

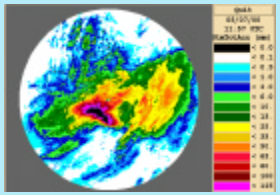




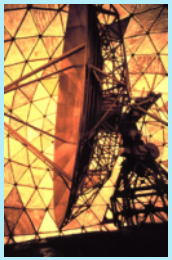
Water Predictions for Life Decisions

Advanced Hydrologic Prediction Services (AHPS)

Leveraging NOAA's Infrastructure and Expertise



Precipitation Estimates

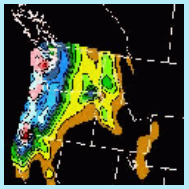


Radar Data

Satellite Data

River Gage Data

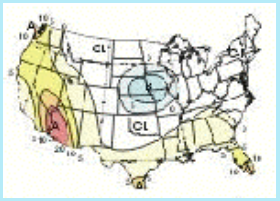
Weather Observations



Precipitation Forecasts

AHPS

AWIPS



Climate Predictions

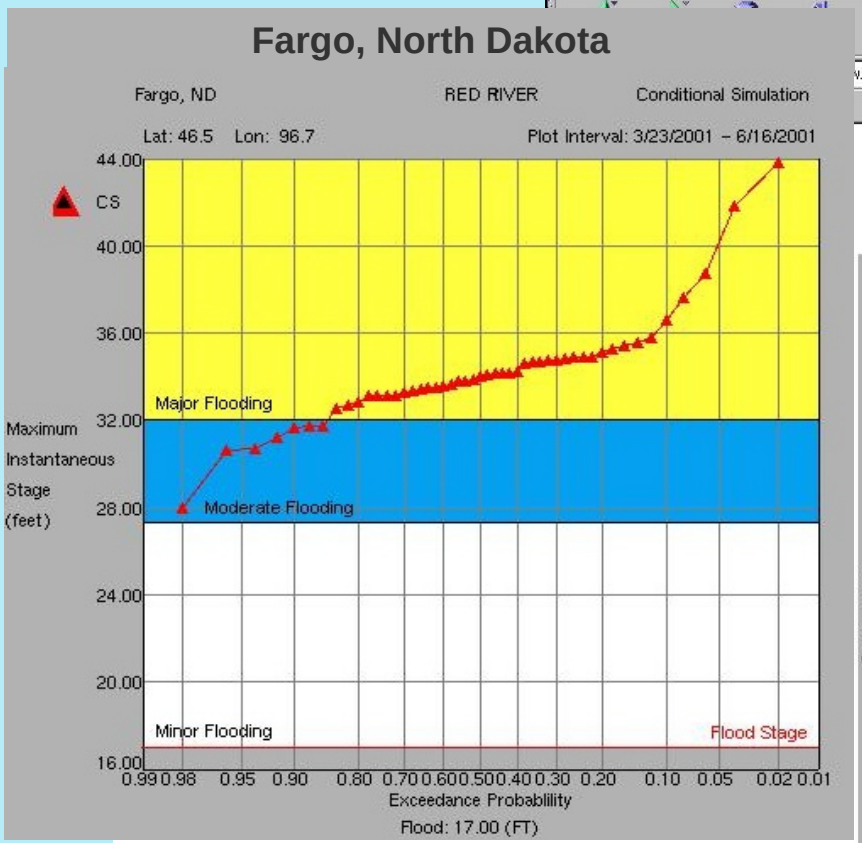
Reservoir Releases

Valuable Data and Forecasts
Satisfy Diverse Customer Needs

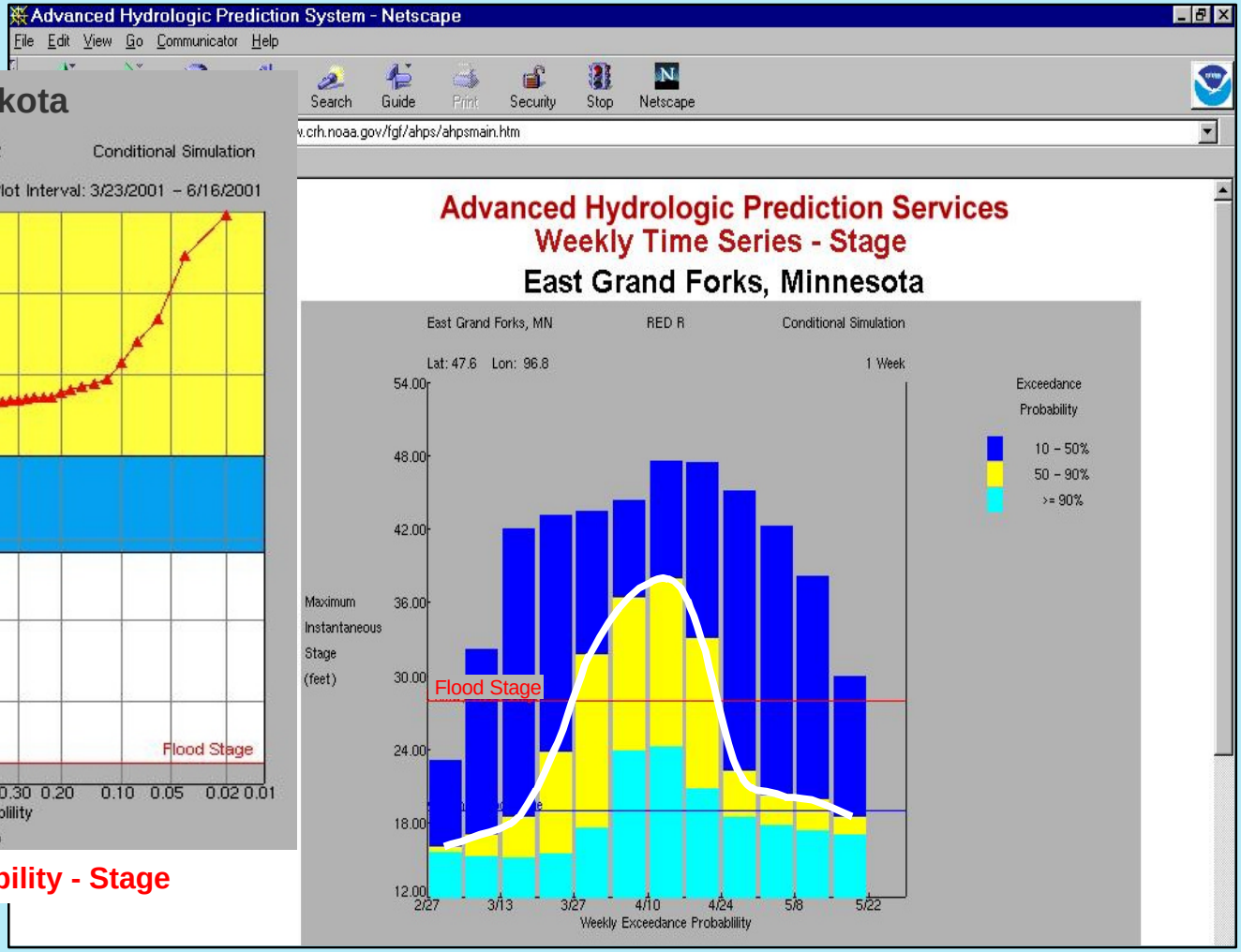
Water Predictions for Life Decisions

Advanced Hydrologic Prediction Services (AHPS)

Augmenting NOAA's Web Presence



90 Day Exceedence Probability - Stage



Water Predictions for Life Decisions

Advanced Hydrologic Prediction Services (AHPS)

Satisfying Diverse Customer Needs

AHPS "…reflect the uncertainty in flood forecasting and help keep people from relying too heavily on one reassuring (or scary) number." Grand Forks Herald, Saturday, February 17, 2001

Holman Field, St. Paul, Minnesota, April 2001

Ellen Gordon, Administrator, Iowa Emergency Management, and Terry Reekers, Emergency Manager, Emmet County, Iowa

Water Predictions for Life Decisions

Advanced Hydrologic Prediction Services (AHPS)

Supporting Local Communities

Jerry DeMarce, Project Manager, Rock Island District, U.S. Army Corps of Engineers
Bob Hummel, Emergency Manager, Buchanan County, Independence, Iowa

"AHPS are very important to me… Without AHPS we'd have a real gap in knowing what's coming…", Terry Reekers, Emergency Manager, Emmet County, Iowa

During just one flow event, use of AHPS saved the navigation industry $300,000 – William Koellner, Water Control Chief, US Army Corps of Engineers, Rock Island Illinois

"…easy … to get a whole lot of new information on flooding – including AHPS – by logging on to the service's Web site. …emergency managers will find more value in the new service than the old one…
Becky Ault, Cavalier County emergency manager, said…she's happy about easier access to NWS information.", Grand Forks Herald, February 16, 2001

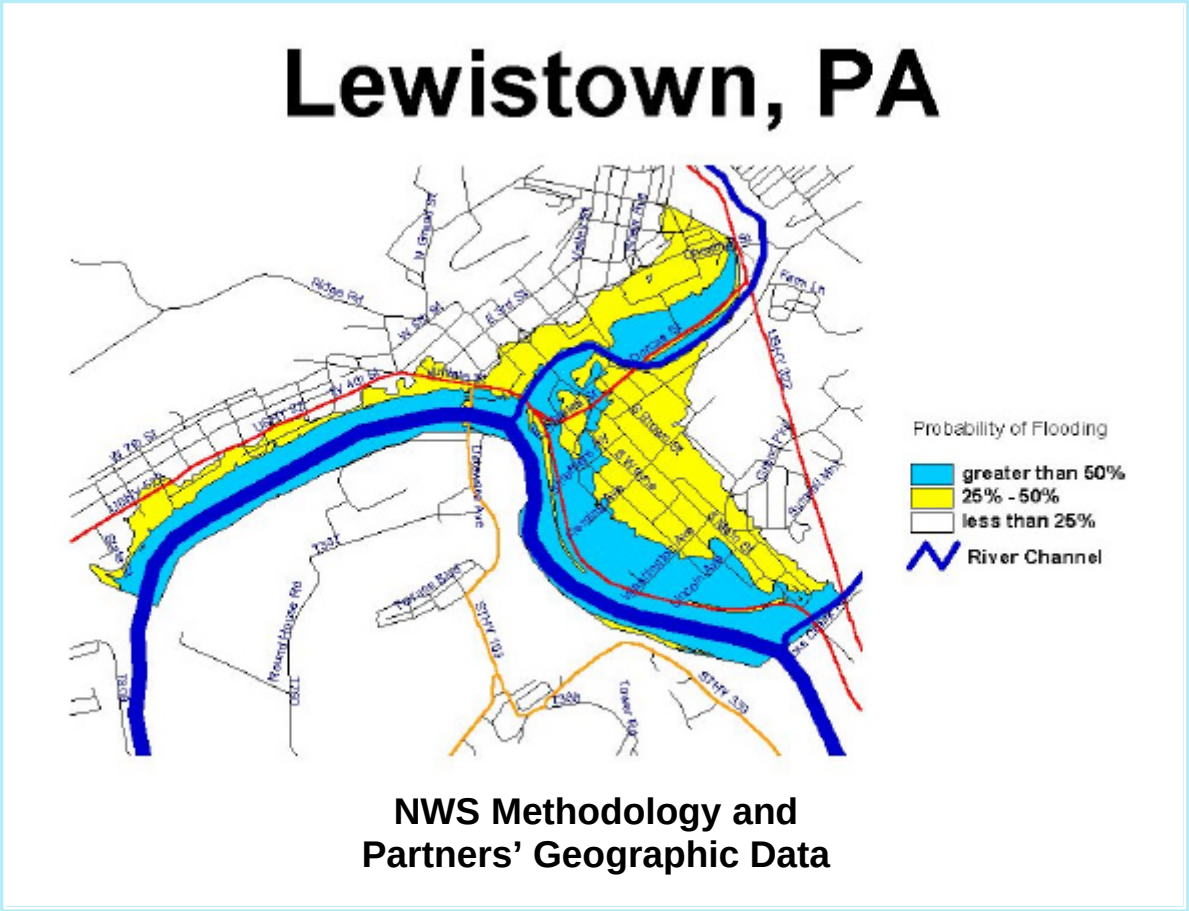
Using AHPS, average annual flood damages were reduced 35% below Saylorville Reservoir (Des Moines) – Hydrologic Research Center

Water Predictions for Life Decisions

Advanced Hydrologic Prediction Services (AHPS)

Partnering to Fulfill the Vision

Barry Halling, Coordinator, Emergency Management Agency, Dallas County, Iowa, and
Lori Morrisey, Coordinator, Emergency Management Agency, Story County, Iowa



NWS Methodology and Partners' Geographic Data

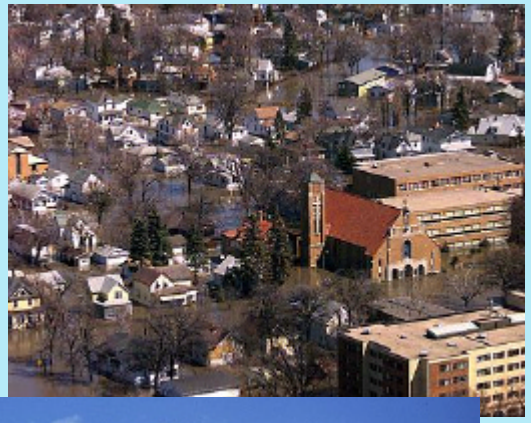
Flood Forecast Mapping

Water Predictions for Life Decisions

June 19, 2001

Improving Services -- Outcomes

- Reduce loss of life and property
- Save $600M per year
  ($200M flood losses; $400M water resources)
- Exploit scientific advances
- Meet energy production and water resource challenges



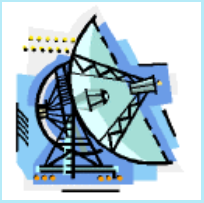
Water Predictions
for
Life Decisions

Science Improvement

Leverage Partnerships – NOAA and other government agencies and universities to incorporate community validated hydrologic forecast techniques:

– Distributed Model Intercomparison Project
– Snow Model Intercomparison Project
– Precipitation Estimation
– Hydrologic Modeling

Integrate Technology – merge finer scale radar, weather forecasts, and climate predictions to specify uncertainty of hydrologic forecasts



Custom Fit – tune models to unique river basin characteristics and climate conditions

Advanced Hydrologic Prediction Services (AHPS)

Program Status Through FY 2001

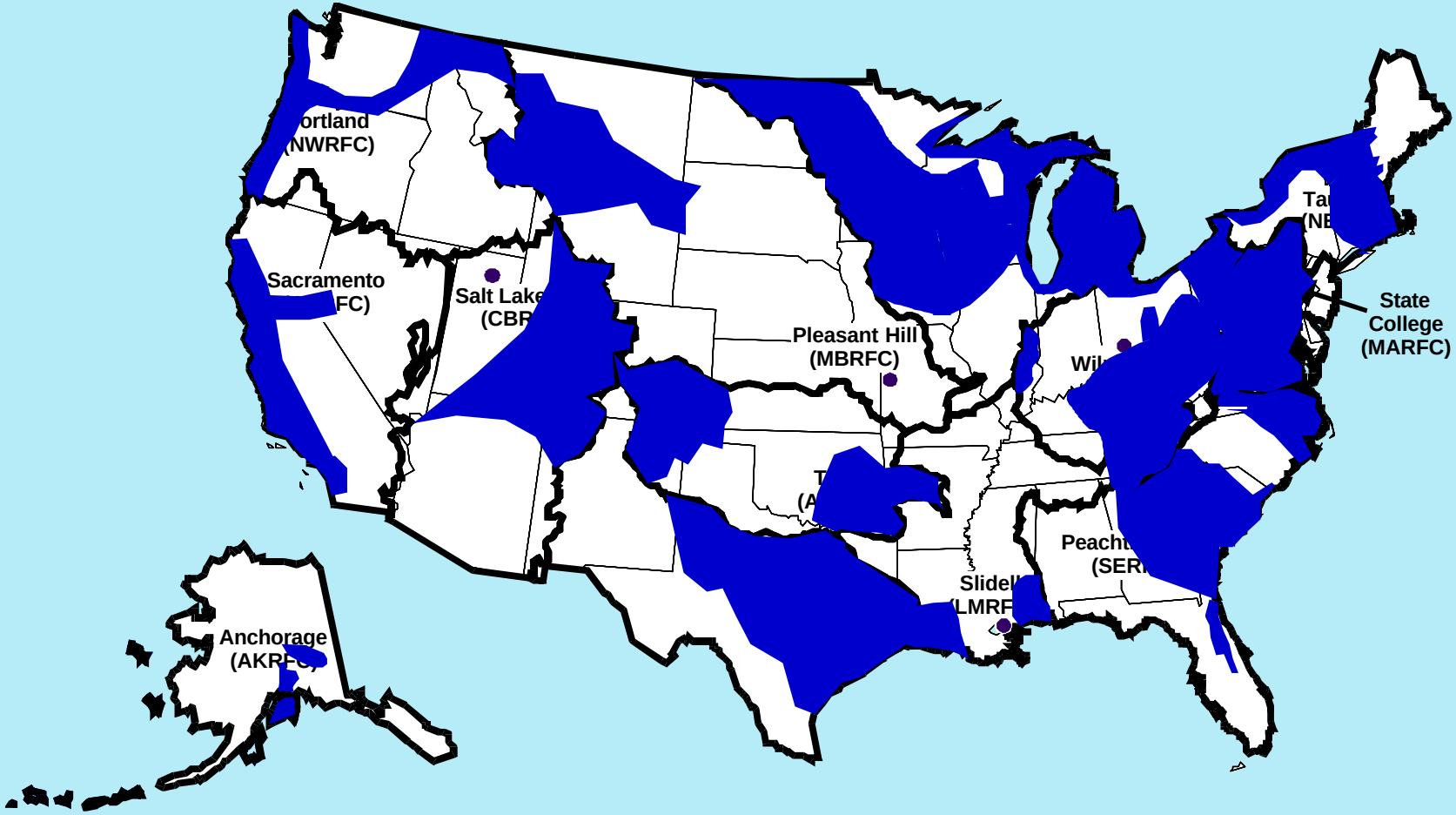
Service Locations

162 of 4,010 forecast locations

Water Predictions
for
Life Decisions

Advanced Hydrologic Prediction Services (AHPS)

Next Implementation Areas



All NWS River Forecast Centers included and 50 percent of river forecast sites.

Water Predictions
for
Life Decisions

June 19, 2001

Advanced Hydrologic Prediction Services (AHPS)

Budget Summary

Major Cost ($K) Components	President's Budget FY00	FY01	FY02	Complete Acquisition
Acquisition				
Services Implementation	996	463	465	40,319
Software Refresh		50	50	3,660
Total Acquisition	996	513	515	43,979
Recurring				
Science Infusion		135	135	7,790
Software Enhancement		200	200	5,240
Verification		75	75	1,040
Training/Outreach		75	75	2,080
Total Recurring		485	485	16,150
Total	996	998	1,000	60,129
Cumulative Forecast Locations	27	162	209	4,010

Water Predictions for Life Decisions